CLAIMS

1. A method for eliminating loops in a communication network, which includes nodes mutually connected by network segments, the method comprising:

configuring the nodes to operate as virtual bridges, having virtual ports that link the virtual bridges one to another over respective virtual connections, each of the virtual connections coinciding respectively with one or more of the network segments;

assigning to the virtual ports respective port costs that are responsive to a count of the network segments with which the respective virtual connections coincide, so as to favor virtual paths between pairs of the nodes that are made up of a greater number of the virtual connections, relative to the virtual paths that are made up of a lesser number of the virtual connections;

computing respective path costs for the virtual paths, based on the port costs; and

selecting the virtual connections over which to send traffic between the virtual bridges responsive to the path costs.

2. A method according to claim 1, wherein the nodes and segments are configured in a ring topology.

3. A method according to claim 2, wherein selecting the virtual connections comprises selecting the virtual connections so that the virtual connections over which the traffic is sent define simple paths conforming to the ring topology.

4. A method according to claim 1, wherein selecting the virtual connections comprises blocking one or more of the virtual connections so that for each of the network

segments, there is only a single one of the virtual connections coinciding with it over which the traffic is sent.

5. A method according to claim 4, wherein blocking the one or more of the virtual connections comprises, when a first virtual connection between a first virtual bridge and a second virtual bridge overlaps a sequence of two or more virtual connections between the first virtual bridge, one or more intermediate virtual bridges, and the second virtual bridge, blocking the first virtual connection.

6. A method according to claim 1, wherein configuring the nodes comprises configuring the virtual bridges to convey the traffic therebetween using a label-switching protocol.

7. A method according to claim 6, wherein configuring the virtual bridges comprises arranging the virtual bridges to provide a transparent local area network service (TLS) using the label-switching protocol.

8. A method according to claim 7, wherein selecting the virtual connections comprises running a spanning tree protocol (STP) on the TLS.

9. A method according to claim 1, wherein assigning the respective port costs comprises setting each of the port costs equal to a first constant times the count of the network segments with which the respective virtual connections coincide, less a second constant.

10. A method according to claim 9, wherein computing the respective path costs comprises summing the port costs of the virtual connections making up the virtual paths, so

that each of the path costs is equal to the first constant times the count of the network segments with which the respective virtual connections making up the virtual paths coincide, less the second constant times the number of the virtual connections making up the virtual paths.

11. A method for eliminating overlap in a communication network, which includes nodes mutually connected by network segments, the method comprising:

configuring the nodes to operate as virtual bridges having virtual ports that link the virtual bridges one to another over respective virtual connections, each of the virtual connections coinciding respectively with one or more of the network segments;

selecting the virtual connections over which to send traffic between the virtual bridges such that when a first virtual connection between a first virtual bridge and a second virtual bridge overlaps a sequence of two or more other virtual connections between the first virtual bridge, one or more intermediate virtual bridges, and the second virtual bridge, the first virtual connection is blocked, and the traffic is sent over the sequence of virtual connections.

12. A method according to claim 11, wherein the nodes and segments are configured in a ring topology.

13. A method according to claim 12, wherein selecting the virtual connections comprises selecting the virtual connections so that the virtual connections over which the traffic is sent define simple paths conforming to the ring topology.

14. A method according to claim 11, wherein selecting the virtual connections comprises blocking at least the first virtual connection so that for each of the network segments, there is only a single one of the virtual connections coinciding with it over which the traffic is sent.

15. A method according to claim 11, wherein configuring the nodes comprises configuring the virtual bridges to convey the traffic therebetween using a label-switching protocol.

16. A method according to claim 15, wherein configuring the virtual bridges comprises arranging the virtual bridges to provide a transparent local area network service (TLS) using the label-switching protocol.

17. A method according to claim 16, wherein selecting the virtual connections comprises running a spanning tree protocol (STP) on the TLS.

18. A device for operation as one of a plurality of nodes in a communication network, in which the nodes are mutually connected by network segments, the device comprising:

one or more ports, adapted to send and receive traffic through the communication network; and

a traffic processor, configured to process the traffic so that the device operates as a virtual bridge, having virtual ports that link the device to other virtual bridges in the network over respective virtual connections, each of the virtual connections coinciding respectively with one or more of the network segments,

wherein the traffic processor is adapted to assign to the virtual ports respective port costs that are

responsive to a count of the network segments with which the respective virtual connections coincide, so as to favor virtual paths between pairs of the nodes that are made up of a greater number of the virtual connections, relative to the virtual paths that are made up of a lesser number of the virtual connections, to compute respective path costs for the virtual paths, based on the port costs, and to select the virtual connections over which to send the traffic between the virtual bridges responsive to the path costs.

19. A device according to claim 18, wherein the nodes and segments are configured in a ring topology.

20. A device according to claim 19, wherein the traffic processor is adapted to select the virtual connections so that the virtual connections over which the traffic is sent define simple paths conforming to the ring topology.

21. A device according to claim 18, wherein the traffic processor is adapted to block one or more of the virtual connections so that for each of the network segments, there is only a single one of the virtual connections coinciding with it over which the traffic is sent.

22. A device according to claim 21, wherein the traffic adapter is adapted to block the one or more of the virtual connections such that, when a first virtual connection between a first virtual bridge and a second virtual bridge overlaps a sequence of two or more virtual connections between the first virtual bridge, one or more intermediate virtual bridges, and the second virtual bridge, the first virtual connection is blocked.

23. A device according to claim 18, wherein the traffic processor is adapted to convey the traffic through the ports using a label-switching protocol.

24. A device according to claim 23, wherein the virtual bridges are arranged to provide a transparent local area network service (TLS) using the label-switching protocol.

25. A device according to claim 24, wherein the traffic processor is adapted to select the virtual connections by running a spanning tree protocol (STP) on the TLS.

26. A device according to claim 18, wherein the traffic processor is adapted to set each of the port costs equal to a first constant times the count of the network segments with which the respective virtual connections coincide, less a second constant.

27. A device according to claim 26, wherein the traffic processor is adapted to compute the respective path costs by summing the port costs of the virtual connections making up the virtual paths, so that each of the path costs is equal to the first constant times the count of the network segments with which the respective virtual connections making up the virtual paths coincide, less the second constant times the number of the virtual connections making up the virtual paths.

28. A device for operation as one of a plurality of nodes in a communication network, in which the nodes are mutually connected by network segments, the device comprising:

one or more ports, adapted to send and receive traffic through the communication network; and

a traffic processor, configured to process the traffic so that the device operates as a virtual bridge, having virtual ports that link the device to other virtual bridges in the network over respective virtual connections, each of the virtual connections coinciding respectively with one or more of the network segments,

wherein the traffic processor is adapted to select the virtual connections over which to send traffic between the virtual bridges such that when a first virtual connection between a first virtual bridge and a second virtual bridge overlaps a sequence of two or more other virtual connections between the first virtual bridge, one or more intermediate virtual bridges, and the second virtual bridge, the first virtual connection is blocked, and the traffic is sent over the sequence of virtual connections.

29. A device according to claim 28, wherein the nodes and segments are configured in a ring topology.

30. A device according to claim 29, wherein the traffic processor is adapted to select the virtual connections so that the virtual connections over which the traffic is sent define simple paths conforming to the ring topology.

31. A device according to claim 28, wherein the traffic processor is adapted to block at least the first virtual connection so that for each of the network segments, there is only a single one of the virtual connections coinciding with it over which the traffic is sent.

32. A device according to claim 28, wherein the traffic processor is adapted to convey the traffic through the ports using a label-switching protocol.

33. A device according to claim 32, wherein the virtual bridges are arranged to provide a transparent local area network service (TLS) using the label-switching protocol.

34. A device according to claim 33, wherein the traffic processor is adapted to select the virtual connections by running a spanning tree protocol (STP) on the TLS.

35. A communication network comprising a plurality of nodes and network segments connecting the nodes in a ring topology,

wherein the nodes are adapted to send and receive traffic over the segments and to process the traffic so as to operate as virtual bridges, having virtual ports that link each of the nodes to other virtual bridges in the network over respective virtual connections, each of the virtual connections coinciding respectively with one or more of the network segments,

and wherein the nodes are further adapted to assign to the virtual ports respective port costs that are responsive to a count of the network segments with which the respective virtual connections coincide, so as to favor virtual paths between pairs of the nodes that are made up of a greater number of the virtual connections, relative to the virtual paths that are made up of a lesser number of the virtual connections, and to compute respective path costs for the virtual paths, based on the port costs, and to select the virtual connections over which to send the traffic between the virtual bridges responsive to the path costs.

36. A communication network comprising a plurality of nodes and network segments connecting the nodes in a ring topology,

wherein the nodes are adapted to send and receive traffic over the segments and to process the traffic so as to operate as virtual bridges, having virtual ports that link each of the nodes to other virtual bridges in the network over respective virtual connections, each of the virtual connections coinciding respectively with one or more of the network segments,

and wherein the nodes are further adapted to select the virtual connections over which to send traffic between the virtual bridges such that when a first virtual connection between a first virtual bridge and a second virtual bridge overlaps a sequence of two or more other virtual connections between the first virtual bridge, one or more intermediate virtual bridges, and the second virtual bridge, the first virtual connection is blocked, and the traffic is sent over the sequence of virtual connections.